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Addressing the Issue of Climate Change Denial

Katherine M. Kacsur

South Carolina Honors College Senior Thesis

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Defense: April 20th, 2017 at 6:00 pm

Conference Room, Honors Dormitory

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Introduction

"No challenge poses a greater threat to future generations than climate change." Barack Obama, 2015 State of the Union Address.

Climate change is real. It is not a debate, and it is not a theory. It is not a part of the "liberal agenda", and is not a ploy to raise taxes or expand government. Climate change is real, and it is happening right now. Every time someone starts their car, turns on a light, or cranks up the air conditioning, carbon dioxide is added to the atmosphere. Because of its power to capture heat in the atmosphere, carbon dioxide has allowed for more and more warming around the globe. As energy consumption only continues to increase, the effects of global warming and climate change will also grow. However, this phenomenon is criticized by many for being untrue. These skeptics argue that climate change is not real, or that if it is, human activity has nothing to do with it.

Over 97% of scientists agree that climate change is both human caused and dangerous. However, a 2014 poll found that only 57% of Americans would agree (Ipsos Mori 2014). The poll also found that 50% of American believe climate change is simply a means for government to increase its power over citizens. What can explain this large discrepancy in science and public opinion? According to Michael Mann, a climatologist with experience dealing with climate change skeptics, "But even as evidence has become unmistakable, and even through the alarm has been sounded several times, public policy has been paralyzed - sometimes from ignorance, sometimes from uncertainty, but often from a campaign of disinformation," (2016). The cause of denialism seems to go beyond a genuine disbelief in the science. Rather, it is fueled by political, economic, and social interests with ulterior motives. Whether these motives stem from fossil fuel money, political pressure, or a psychological predisposition for denial, denialism is a problem that inhibits

any effective legislation or action toward curbing climate change. As activists fight to study, regulate, and mitigate the effects of climate change, they are hindered by the criticism of skeptics.

Most of the current literature on climate change either studies the scientific basis of climate change or the problems that denialists cause for the climate change movement. Current discussions focus on the fact there there is a problem, many people deny this problem, and that change must be made in order to halt further damage. However, there is a surprising lack of discussion on how the barriers built by the skeptics can be brought down. The current lack of progress in the United States in the way or action or legislation is acknowledged by all, but no one is attempting to solve the dilemma. Before any sort of geoengineering or policy solutions can be implemented, people must be convinced of the reality of the problem. Climate denialism is a hurdle that must be overcome before serious action to mitigate climate change can begin.

The purpose of this paper is not to attempt to extensively prove the existence and variations of climate change denialism. Rather, the goal of this paper is to analyze this phenomenon, followed by a proposal for a course of action. What this paper seeks to convey is that much of the prevailing research and literature on climate change deals either with proving it scientifically, identifying those who deny the existence of any issue, or suggesting policy and technology changes to combat climate change. However, there is a vital link missing between providing the sufficient evidence and implementing changes based on that evidence. This link involves convincing people that climate change is an issue. Before any sort of legislation, policy, or economic transformation can be made, people need to actually understand that climate change is an issue. It is not until people accept climate change as a substantial threat that politicians, business leaders, and their communities will actually begin to combat the effects of climate change.

The purpose of this project is to first synthesize all of the current information about climate change and denialism. I then want to demonstrate the missing piece of research between the topic of climate denial and potential solutions for climate change. Before any change can be made regarding climate change, people need to be convinced of its importance. This project hopes to lay a roadmap for winning the skeptics over to the side of climate activism.

Scientific Background

"Wake up, America. With all the hysteria, all the fear, all the phony science, could it be that manmade global warming is the greatest hoax ever perpetrated on the American people? I believe it is." James Inhofe, Senate Floor.

On February 19, 2015, Senator James Inhofe, the chairman of the Senate Committee on Environment and Public Works, brought a snowball to the Senate floor (Bump 2015). The purpose of this demonstration was to show that the globe cannot possibly be warming if there is snow outside in Washington, D.C. Inhofe's actions only demonstrate his view that climate change is, in his words, "the greatest hoax ever perpetrated on the American people." Unfortunately, Inhofe is not alone. Only 34% of moderate Republicans and 15% of conservative Republicans in the United States agree that the Earth is warming as a result of human activity (Funk 2016). Climate change is a serious issue that needs to be addressed because of the massive implications it holds for the safety and livelihood of many generations to come. However, action is difficult when many people, including political, economic, and social leaders, refuse to acknowledge the problem. In order to plan for and prevent a future of economic and social instability, climate change needs to be addressed by a majority of the American public as an issue. It is only after the citizens and leaders of this nation can get on board with the implications of climate change that serious action can be taken to mitigate it.

The discovery of the greenhouse effect and the subsequent potential for global warming are relatively new. In 1861, Irish scientist John Tyndall discovered that water vapor and other gases possess a greenhouse effect in Earth's atmosphere whereby molecules of certain gases trap heat (Black 2013) The Industrial Revolution, which began around that time, is said by climate scientists to be the impetus for visible trends in global climate change. However, it wasn't until the 1960s that people began seeing the environment as both valuable and extremely threatened by human activity. In 2016, John Cook and several colleagues performed a study of the opinions of many climate scientists, concluding that there exists an overwhelming consensus among them that climate change is occurring. To be specific, over 97% of scientists researching climate change agree on the anthropogenic nature and negative consequences of climate change.

Aside from the scientific sector, many private, governmental, and international organizations agree that climate change is a serious issue. Scientific evidence compiled by the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), the Intergovernmental Panel on Climate Change (IPCC), the Environmental Protection Agency (EPA), numerous universities across the U.S., and other research organizations all point toward the existence of climate change. Their studies indicate that the tangible effects of climate change include rising temperatures, sea level rise, warming oceans, shrinking ice sheets, shrinking floating ice, ocean acidification, decreased snow cover, and extreme weather events (Dryzek, Norgaard, Schlosberg 2011) (NASA 2016). For example, one effect is that the global sea level has risen about seven inches over the last century. Greenland and Antarctica ice sheets have also decreased in mass, a phenomenon that has been recorded through satellite data (NASA 2016). Antarctica has been losing about 134 gigatons of ice per year since 2002, Greenland loses 287 gigatons per year. While there is natural fluctuation in the amount of

ice due to changing seasons, the overall amount of ice declines from year to year. Floating ice in the arctic has also shrunk by about 13.4% per decade (NASA 2016). Atmospheric carbon dioxide dissolving into the ocean has also led to a 30% increase in the acidity of the oceans since the Industrial Revolution. In addition, this much carbon dioxide has not been in the atmosphere since 3.6-2.2 million years ago, when oceans were 100 feet higher and temperature was 11 degrees warmer than they are today (EPA 2016).

Why is climate change an issue? First, it is important to look at the impact of climate change on ecosystem stability. According to the Nature Conservancy (2016), a change in even one degree Fahrenheit can upset ecosystems. Changing climate and precipitation patterns will largely affect plant and animal communities, which may lead to the loss of many species and thus a loss of many ecosystem functions. Ecosystems are consistently undervalued by humans for their resources and functions. Some of the valuable uses that natural ecosystems provide include food, timber, fuel, pharmaceutical compounds, purification of air and water, decomposing waste, and providing soil nutrients (Ecological Society of America 1997). Biodiversity (The Nature Conservancy, 2016) is similarly threatened by climate change due to the sensitive existence of many species of both plants and animals. Biodiversity allows for many of the functions listed above to exist. Ecosystem stability and biodiversity are threatened by changing climate, and as a result, animals and plants must either adapt, migrate, or face extinction.

Another reason this issue is important is for a factor that many initially fail to realize, which is that climate change will have large implications for national security. Water resources have caused conflict for thousands of years. Legends involving perilous storms and droughts date back to 5000 BC in the civilizations of Sumer and Assyria (Jerome 2015). More recent conflict over water can be seen in the destruction of Soviet water supplies during WW2, the Syrian civil war,

and the 2012 riots in South Africa over water scarcity. Changing precipitation patterns will greatly affect both the supply of water and the prevalence of natural disasters, which can lead to political conflict. Food insecurity is also a likely result of changing water resources and ocean warming/acidification. Both the agricultural and fishing industries will be hit with obstacles as weather and climate continue to change, altering the ecosystems of many species of plants and fish. There is also the issue of sea level rise. Kiribati, an island nation in the Pacific, has adopted a policy of "migration with dignity" (McNamara 2015). The Kiribati government encourages its residents to migrate elsewhere because the island nation is slowly becoming submerged in water, leaving many of its citizens homeless and distraught.

There are also ethical implications of climate change (Moss 2016). Is it morally right to allow actions that harm other people to take place? This is what is happening with Kiribati and other displaced nations. The actions of large, industrialized nations have a large impact on other, less developed nations. In the case of Kiribati, warming due to emissions from the U.S., China, Europe, and other nations has caused the displacement of native people from their homes on this island. To harm other people who are powerless to fight back is unjust. It is important to take into account these ethical considerations when addressing these issues. The main conflict in this debate is whether or not future generations should be accounted for in the weighing of options regarding climate change regulations. However, the negative effects of climate change are too large for people to allow to run amuck. The negative consequences that climate change would have on ecosystems, biodiversity, food, water, and political stability are all too great to be ignored.

The scientific foundation for climate change would make it appear that is an established issue in today's world. However, there remains widespread uncertainty and debate about climate change, begging the questions as to why such debate exists. Logically, it would seem that such

scientific consensus on a topic would mean it has taken on the role of scientific fact in society. Michael Mann, a climatologist and geophysicist who has received intense backlash from climate change denialists, says "It is difficult to know whether climate change contrarians have taken their positions out of good faith, ignorance, willful ignorance, or calculated deceit," (2016, p. 115). In order to better understand why such a large body of the American public refuses to acknowledge scientific fact, it is crucial to understand the different directions from which denialism comes. There are enormous economic interests at stake in the debate, especially revolving around coal, oil, and gas. Fossil fuels have a lot to lose if carbon dioxide, the main emission from their burning, is found harmful. Politicians are also influenced by the debate because of a) the makeup of their constituencies, and b) the monetary influence that big businesses and organizations have on campaigns. However, not everyone who denies climate change may have an ulterior motive in mind. Psychology and pure skepticism also play a role in building a foundation for doubt by predisposing people to certain notions or ideas. No matter what the reason, though, climate change deniers need to be brought into the light when it comes to the seriousness of this issue. The next section will look at the various causes of denialism, spanning economic, political, and psychological factors.

Over 97% of scientists believe that anthropogenic climate change is real. However, only 47% of political conservatives in the United States would agree with this (Lehman 2016). This figure is double what it was around the time of the 2014 midterm elections. This is in contrast to the 80-95% of self-proclaimed political liberals who agree that climate change is happening. These statistics were found in a study performed by Yale and George Mason University, and published in early 2016. In addition, a study by Pew Research found that 34% or less of Republicans agree that human-caused warming is real (Funk 2016). Numerous studies concur with the trend of these

results, and it is evident to even the non-politically active that the leading conservative and liberal political parties in the United States, i.e. Republicans and Democrats, feel differently about the issue of climate change. This begs the question: what causes such a discrepancy in the way the two main American political parties view one of the most pressing environmental issues of our time?

The "Debate"

"Troposphere, whatever. I told you before I'm not a scientist. That's why I don't want to deal with global warming." Antonin Scalia, Merchants of Doubt.

Climate change is intertwined with politics. Since the first inklings of a threat, opposition has formed to deny and destroy any evidence that may point toward the truth. In 1958, Charles David Keeling began studying atmospheric carbon dioxide concentrations with the Scripps Institute of Oceanography on Mauna Loa, Hawaii (Monroe 2013). He began studying diurnal carbon dioxide fluctuations in 1953 at Caltech in Pasadena, California, which interested Roger Revelle of Scripps. Through Revelle, Keeling was able to embark on a carbon dioxide project studying long-term trends in carbon dioxide concentrations based in Mauna Loa. By the 1970s, Keeling's records indicated a continual rise in carbon dioxide concentrations, catching the attention of scientists, politicians, and big business. Climate change and many other environmental issues were brought to the public eye around this time. The Keeling curve is still growing today, showing both annual variation and long term growth in carbon dioxide concentrations (Figure 1).

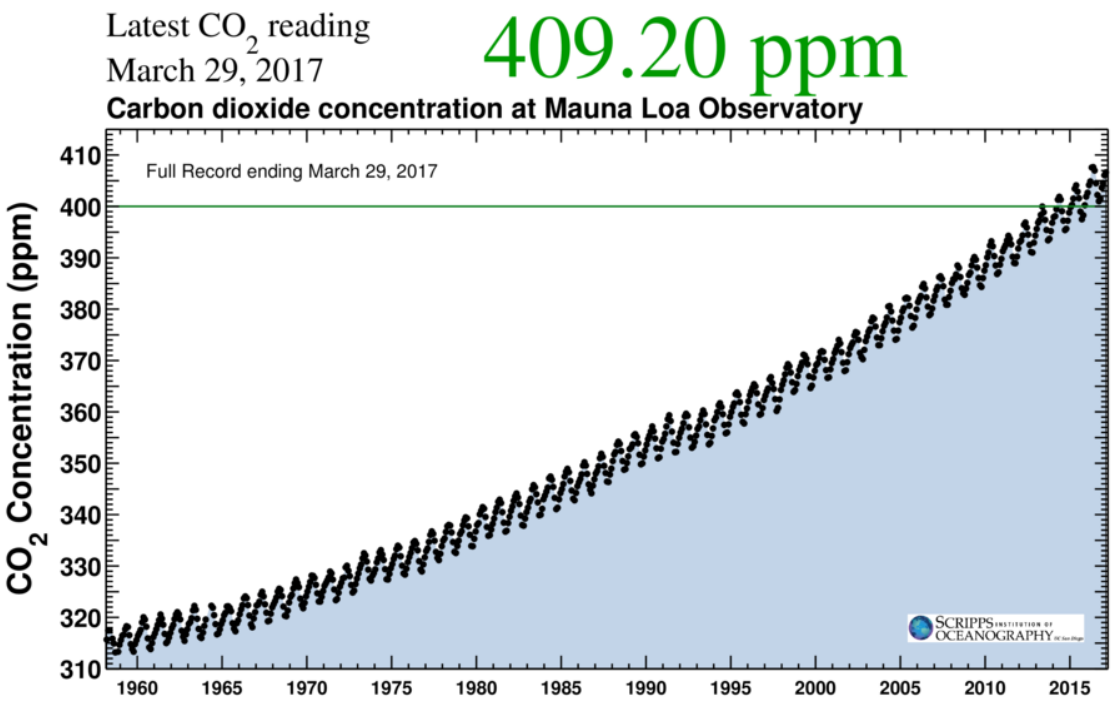

Figure 1: The Keeling Curve.

https://scripps.ucsd.edu/programs/keelingcurve/2013/04/03/the-history-of-the-keeling-curve/

During the 1960s and 1970s, scientists and economists were beginning to understand the implications of climate change. However, there was much disagreement over the exact effects, the degree of the effects, and potential solutions to the issue. This confusion and disagreement opened the door for those who were skeptical of climate change to begin with. If a movement or a group lacks a united front, it is easier for the opposition to weaken its cause.

Studies were conducted in the 1970s by the Jason group and the National Academy of Science on the potential impacts of carbon dioxide on the planet (Oreskes & Conway 2010). The Jason group found undeniable consequences of increased carbon dioxide concentrations on global warming, and the National Academy of Science confirmed these findings. This created a stir in the White House during Jimmy Carter's administration. However, these reports were received not

with skepticism, but with dismissal. The White House told scientists leading the studies that they would address the issue of climate change when it begins to have damaging effects. It was not grasped that by then, it would be too late, and the dominoes would already have begun to fall.

The year of 1988 saw high temperatures and severe drought across the U.S. As crops failed and livestock suffered, people began to wonder all of it was just the effects of climate change finally coming to fruition. A hearing was held by the U.S. Congress to discuss the issue of climate change, featuring James Hansen, the director of the Goddard Institute for Space Studies. Because of the current environmental crisis, the hearings (and Hansen's testimony) received widespread media attention.

This created a political pressure on newly-inaugurated President George H.W. Bush. In 1989, Bush sent his secretary of state to the first International Panel on Climate Change (IPCC) meeting. He also charged the Federal Coordinating Council for Science, Engineering, and Technology to submit an initiative for tackling climate change. The U.S. Senate simultaneously created a bill, the National Global Change Research Act, proposing a similar course of action. However, that same year, the George C. Marshall Institute, originally created to back President Reagan's Strategic Defense Initiative, released a paper boasting the failures of Hansen's findings. It claimed that any excessive warming in recent years was caused by fluctuations in the sun's output, and that the planet would soon cool. Hansen's report had looked comprehensively at several factors that impact climate: carbon dioxide, the sun, volcanoes, etc. The skeptics' report only focused on the sun. The skepticists also argued that the climate is extremely sensitive to small changes in solar input, but ignored the fact that this proposed high level of sensitivity would also indicate a vulnerability to small changes in carbon dioxide concentrations as well.

In 1988, the World Meteorological organization and the United Nations Environment Programme created the Intergovernmental Panel on Climate Change (IPCC) to study the potential effects of human induced climate change (United Nations Foundation n/a). In 1990, the IPCC released its first assessment of the issue, which led to the conclusion that fossil fuel emissions are inextricably tied to global warming (Oreskes & Conway 2010). The IPCC rejected the findings of the Marshall Institute, but the leaders of the Marshall Institute were not discouraged. Rather, one of their lead physicists and founders, Bill Nierenberg, spoke at the World Petroleum Conference in 1992, denouncing the IPCC. The White House also took fascination with the Marshall Institute's report, and it is generally considered the cause for any inaction by the White House on the issue of climate change.

Another instance of scientific dispute affecting politics can be seen in the fiasco between Roger Revelle, a scientist highly supportive of the idea of climate Change, and Fred Singer, a skeptical physicist. Singer had previously participated in the acid rain and ozone hole problems, arguing that humans were not linked to either of these issues (Mann) (Oreskes) The two published a paper together in 1990 in a small journal titled Cosmos. The paper announced a large amount of uncertainty about climate change, and that the probable effects would be minimal. Throughout the writing of the article, however, Revelle suffered a heart attack, a hernia, and an infection, incapacitating him for months. He then suffered another heart attack that ended his life shortly after the paper was published. Although the details are hazy, it would appear Revelle never fully complied with Singer's ideas, and that he was not happy with the outcome of the article. Revelle served as a past mentor for Al Gore, an avid climate change activist who ran for president in 1992. The skeptical paper with Revelle's name on it was used as ammunition in the campaign against

Gore. Revelle's family, friends, and colleagues were outraged at the legacy this paper left on Revelle's name.

Another challenge was presented with the publication of chapter 8 of the IPCC Working Group 1 report. Benjamin Santer was the head of the project. The chapter discussed the closest evidence tying human causes to climate change than ever before. However, a draft was leaked in 1995, igniting a large Republican uproar in Congress. Hearings were held, featuring a well-known skeptic named Patrick J. Michaels. Michaels' criticism of Santer's claims were reviewed by Jerry Mahlman, Director of NASA's Geophysical Fluid Dynamics Lab, who debunked all of Michaels' claims. However, the hearing itself received little press attention, meaning that its debunking went under the radar as well.

The chapter was finally presented to the IPCC in November 1995 and received immediate criticism from Saudi Arabian and Kuwaiti delegates (most likely connected to their nations' extensive oil resources). A working group was appointed to smooth out the rough points of the chapter and to reach a compromise. In the end, the statement that was agreed upon was that "The balance of evidence suggests that there is a discernible human influence on global climate." The term "discernible" was debated and compared with 28 other adjectives before it was settled on. Fred Singer once more entangled himself in the issue with a critique of the chapter in early 1996. He claimed that the evidence for the IPCC chapter was sketchy, extremist, and alarmist. Two other scientists from the American Petroleum Institute and an oil industry lobby advised Congress that the report was fraught with vast assumptions and obvious bias. The chairman of the Marshall Institute, Fred Seitz, also published a letter in the Wall Street Journal denouncing all validity of Santer's report. Seitz was previously involved in the tobacco debate as one of the main proponents of the tobacco industry, arguing its negligible effects on health (Mann 2016).

Overall, The leaders of the skeptic movement in the late twentieth century encompass a few individuals with names that continually reappear as environmental and climate contrarians. They include Fred Seitz, Fred Singer, and Bill Neiernberg, as highlighted by these stories. These three are all linked to the leadership and founding of the Marshall Institute, an organization founded on conservative principles by a conservative president. Oreskes and Conway discuss that this may be linked to the history of the Institute, whose job it was to ensure secrecy and create misrepresentations of the U.S.'s actual defense activities during the Cold War (2010). In addition, Reagan's massive nuclear arms build-up was skeptical and distrustful of the idea of "nuclear winter" (Mann 2016). Those partaking in Reagan's Strategic Defense Initiative disliked the original climate models that predicted a nuclear winter as as result of nuclear war. An ironic pattern has emerged where these same people are similarly skeptical of global warming models and climate change today. Another trend has emerged from the climate change issue, though, regarding its key players. It begins with numerous scientists coming forward with different evidence and reports of climate change, which are repeatedly struck down by the same individuals time and time again.

The wide array of support for the importance and urgency of climate change is continually undervalued by the disproportionate amount of media attention deniers receive (van der Linden 2017) (Oreskes 2015) (Mann 2017). Even though the body of supportive evidence is growing, deniers are still given the same amount of power in the media. Conservative media outlets are even more prone to focusing on the point of view of the skeptics, rather than all other scientists. According to Oreskes and Conway, the media played and continues to play a significant role in political dismissal of climate change.

In their book *The Madhouse Effect,* Michael Mann and Tom Toles also attribute a large part of the climate change issue to the "false balance" given by the media to either side of the debate. The people and organizations that contribute to denialism are treated (incorrectly) as scientific equals to those who have attempted to prove the connection between humans and climate change. This creates a false balance between both sides, demonstrating to the general public that both claims are equally viable. Even though the two sides of the climate change issue are not of equal merit and size, they are both given equal footing in the media. Something that exacerbates this problem is the existence of conservative media outlets that actively seek sources that help justify their beliefs. Fox News, the Wall Street Journal, and the New York Post are just a few examples of large news outlets run by a largely conservative base.

Dr. Renee Lertzman, a psychologist, consultant, and researcher, also puts a heavy emphasis on the role of the media in climate change denial (Gregoire 2015). People listen to others who share similar ideas that will reinforce what they already believe. It is more natural, she claims, for people to spend time listening to others who are similar to them than to those who hold different views that may clash with their own. This underlies the mechanism whereby people with conservative views primarily listen to conservative outlets, which in turn enable and enhance the listener's conservative ideologies. This is known as the "echo-chamber effect," (Gregoire 2015).

Manifestations of Denial

There are different kinds of denial of the importance of this issue. To start, there are those who deny that carbon dioxide levels in the atmosphere are not rising. A close relative of this argument is that the atmosphere is not warming. For example, John Christy and Roy Spencer, revered in their field, used satellite data in the 1990s to show that the lower atmosphere was cooling, not warming. It was not until 2005 that other scientists were able to analyze the Christy

and Spencer's data. They found that a simple mathematical error where a minus sign was substituted for a minus sign led the study to incorrectly conclude that the air was cooling, not warming. There is also the temptation for denialists to choose segments of time in which temperature appears to be decreasing. For example, the period of 1998 to about 2007 demonstrates a general cooling trend. Figure (2) demonstrates that global warming is a general trend unhindered by small, short-lived fluctuations. There is also the calling into question of scientific data that supports climate change. For example, the National Oceanic and Atmospheric Administration published an article (2016) delineating how methods of measuring ocean pH before 1989 were highly inaccurate. Thus, it is impossible to tell if the oceans have actually become more acidic since the Industrial Revolution.

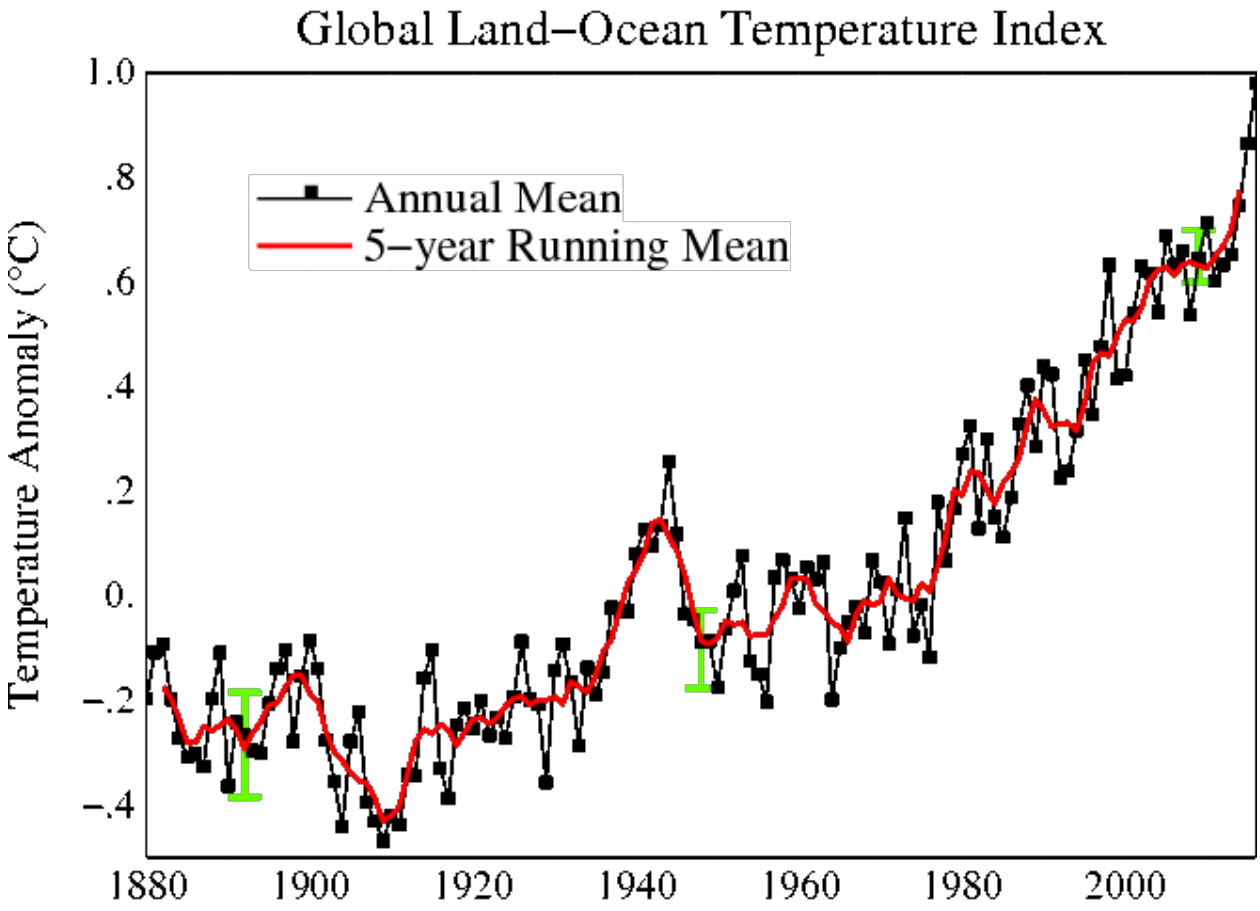

Figure 2: Temperature variation from 1880 to today. https://data.giss.nasa.gov/gistemp/graphs_v3/

There is another argument that global warming is a result of natural processes. Mann and Toles debunk this quickly by the fact that past warm periods were also caused by atmospheric carbon dioxide rises. However, carbon dioxide is now being added more rapidly to the atmosphere than ever before (thanks to humans), which will lead to unprecedented climate changes. In 1998, Michael Mann and two colleagues published a paper with what would come to be known as the infamous hockey stick diagram (Figure 3) (Mooney 2013). The diagram shows temperature anomalies since the year 1000. For almost a thousand years since then, global temperatures fluctuated but overall remained relatively constant. However, around 1900, the graph shows a steep increase in temperature, with a slope resembling the shaft of a hockey stick. The human influence on carbon dioxide and the rapid increase in temperature in the 20th century (and into the 21st) is undeniable, thus effectively shutting down this source of denialism.

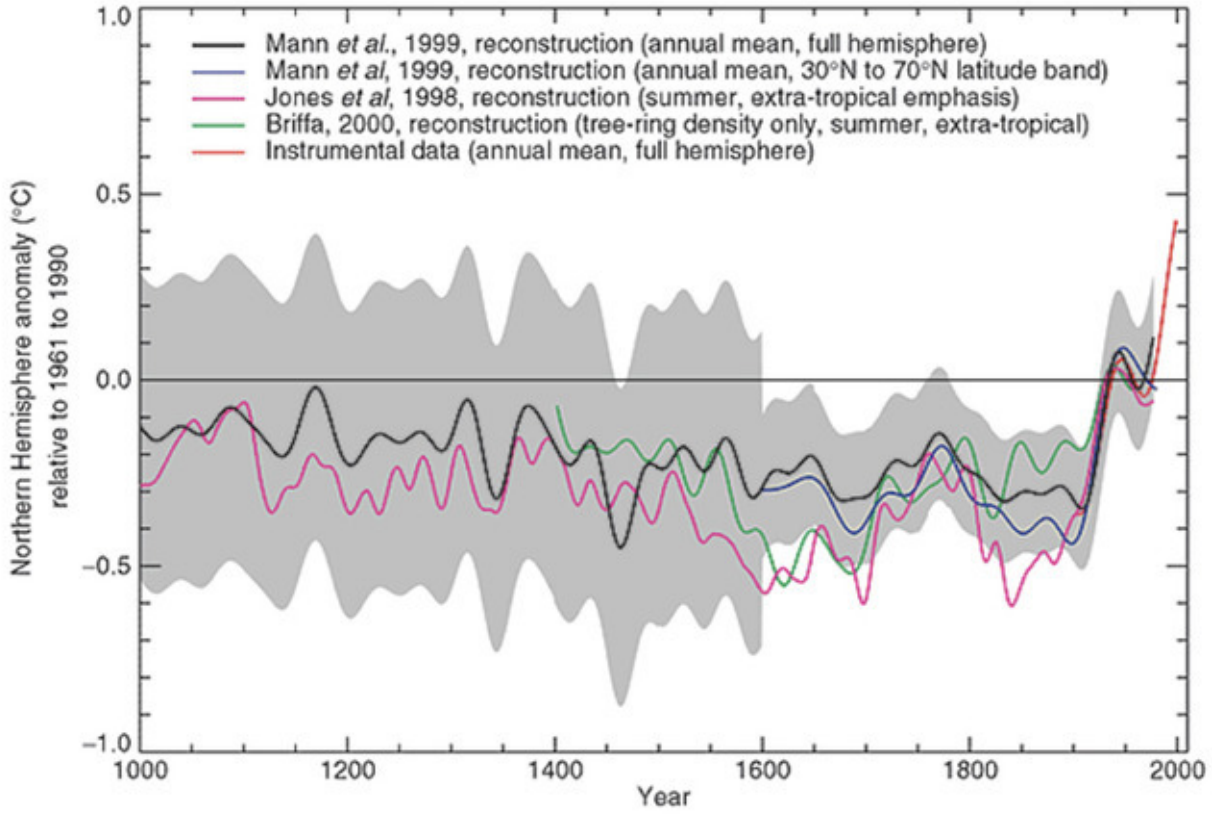

Figure 3: temperature variation from 1000 BC to today.

https://www.theatlantic.com/technology/archive/2013/05/the-hockey-stick-the-most-controversial-chart-in-science-explained/275753/

Another source of denialism is the argument that negative-feedback mechanisms will mediate the effects of climate change. Negative feedback refers to a cause and an effect, with the effect either inhibiting or limiting the occurrence of future causes. For example, when body temperature gets too high, humans will sweat. This sweat cools the body, preventing any more overheating from happening. Many deniers claim that negative feedback mechanisms will prevent the climate from becoming too warm. However, the potential positive feedback mechanisms for climate change outweigh the generally small-scale negative ones that may exist. For example, warming of the atmosphere will cause melting of ice and snow near the poles, leading to less white surface around these areas. This means less reflection of sunlight will occur and instead, more sunlight will be absorbed by the surface. This will increase the surface temperature, leading to more heating, and thus exacerbating global warming. In addition, melting of Arctic permafrost will release methane, an extremely potent greenhouse gas, that has been frozen for centuries. This will lead to more warming, and thus a repetition of this cycle.

Some critics of climate change also claim that increasing temperatures will be good for humanity. One idea is that increased carbon dioxide will only serve as fuel for agriculture. However, studies have shown that alterations in temperature that result from increased CO2 concentrations will have detrimental effects on plants around the tropics. In addition, it will make extreme weather events more likely, potentially leading to hurricanes, droughts, and hail that can damage crops. Another argument is that ice melting from Greenland will open up new land for

colonizing. However, the amount of land lost due to the melting of ice sheets on Greenland vastly outsizes any land gained from Greenland itself.

Lastly, some critics argue that it is too costly to attempt to take action now, and that technological advances in the future will help to mitigate climate change more cost-effectively. "This position, too, is propped up by myths and fallacies. Chief among them is that inaction is the least expensive path forward," Mann says (p. 65). Others argue that climate change action would divert resources and time from other, more pressing issues. While this may be true on a short temporal scale for large, emergent issues, it is typically used as an excuse to push climate change to the end of the list of priorities. Climate change is linked to a host of other issues that are often deemed more important than it, such as food, health, water, and national security. The technology proposed by these people also involves new and extreme ideas, such as sending giant mirrors into orbit around Earth, creating artificial volcanic eruptions, and stimulating the formation of clouds. All of these ideas have never been attempted before and have the potential to overcorrect, causing Earth's climate to revert to what could be considered an ice age.

Political Parties

A major motivation for the denial of climate change is for underlying political/economic reasons. This is where climate change begins to take form as not just a political, but specifically, a partisan issue. Many politicians and businessmen feel victimized by the movement to fight climate change. Reasons for this include it being just a cover for politicians to assert more regulations, and thus control, over industry. There is also discontent among business leaders whose industries are economically handicapped by restrictions on fossil fuel emissions because regulations on emissions often mean that businesses must either produce less or invest in new, often expensive, technology to reduce emissions. Because those who believe in climate change

seek to impose higher standards for clean energy, they often do this through stricter regulations on emissions, and as a result are often criticized for crippling industry and the economy with their sanctions.

The oil, coal, and gas industries have two significant factors at stake in the debate over climate change. The first is that they provide jobs to millions of hardworking Americans. One of the main ideologies of the Republican party is to promote business by reducing regulation. Part of their platform, according to the Republican National Committee's website, is as follows:

> "Keeping energy in the earth will keep jobs out of reach of those who need them most. For low-income Americans, expensive energy means colder homes in the winter and hotter homes in the summer, less mobility in employment, and higher food prices. The current Administration, and particularly its EPA, seems not to care. Its Clean Power Plan — the centerpiece of the President's war on coal — has been stayed by the Supreme Court. We will do away with it altogether," (2016).

The Democratic Party, on the other hand, has a different perspective on how climate change will affect hardworking Americans. According to the Democratic Party's website,

> "Democrats share a deep commitment to tackling the climate challenge; creating millions of good-paying middle class jobs; reducing greenhouse gas emissions more than 80 percent below 2005 levels by 2050; and meeting the pledge President Obama put forward in the landmark Paris Agreement," (2016).

Democrats do not see a shift away from fossil fuels as a hindrance, but rather a help, to the American job force. The replacement of fossil fuels with renewables has the potential to create many new jobs that will more than replace those lost by the abatement of the fossil fuel sector.These two conflicting platforms demonstrate how different the views of the Republican and Democratic parties are with regard to fossil fuels. While the Democratic party seeks to impose regulations that would make it harder to excavate coal and drill for oil, Republicans want to utilize these resources as intensely as possible. Their main argument is that it will help the American

workforce by creating jobs, powering the nation, and stimulating the economy. These are valid arguments because, after all, most people would probably agree that job creation and stability is a good thing. However, Republicans see job creation to be at odds with protecting the environment. There can either be employment or overregulation, they believe, and they choose the former as more favorable. Democrats, on the other hand, see harmony where Republicans see contention, and believe that a shift to renewable energy does not entail all of the negative effects that Republicans threaten.

This is not to say that the Democratic Party is perfect. Based on the 2016 general election results, Democrats were dealt severe blows by a majority of Americans (Politico 2016). Republicans became the majority in the U.S. House and Senate, as well as the Office of the President. Many factors may be linked to the massive losses Democrats faced in the 2016 election, including bad organizational structure, Hillary Clinton's email scandal, or an inability of the Democratic Party to connect to the majority of American voters (Tani 2016) (Liasson 2016). Until they (or another party advocating environmental activism) can learn to appeal or relate to a majority of voters, environmental issues will not be addressed by the legislative or executive branch. President Barack Obama, reflecting on the 2016 election results, admitted to "failures on our part to give people in rural areas or in exurban areas, a sense day-to-day that we're fighting for them or connected to them," (Tani 2016).

Historically, the Republican party has never displayed a proactive record regarding the environment. The 1970s is considered to be the environmental golden age, as this decade saw the birth of many of the nation's most important legislation and regulation regarding the environment. These include the Clean Water Act, Clean Air Act, Endangered Species Act, the Environmental Policy Act (which created the EPA), Safe Drinking Water Act, and many more (Encyclopedia.com

2003). These successes were made primarily during the presidencies of Richard Nixon, Gerald Ford, and Jimmy Carter. Although Nixon and Ford were Republican, the overwhelming support for the environment across the nation during this time made such actions popular among both Democrats and Republicans.

In addition, environmental issues in the past were generally less politically divisive than the more recent climate change debate (Mann 2016). Nixon created the Environmental Protection Agency in 1970, which is a governmental agency designed to protect the environment (Encyclopedia.com 2003). However, the presidency of Ronald Reagan in the 1980s signified a shift in Republican attitude toward the environment. His two terms are characterized by a massive effort toward deregulation of all sectors, the environment included. However, much of Congress's legislation from the 1970s were out of Reagan's reach, and thus survived Reagan's administration. Republican George Bush, who was elected in 1988, also pitted economic benefits against environmental ones. However, he saw the importance in balancing the benefits of environmental protection with economic prosperity and job security. One of his biggest environmental accomplishments was to create the No Net Loss policy regarding wetlands. Bill Clinton, the Democratic president from 1992-2000, sought to improve gas mileage and fuel efficiency and remove arsenic from drinking water. He also argued that economic prosperity and environmental regulation do not have to exist in contention.

However, the return of a Republican to the presidency in 2000 saw a reversal in attitude (Goldenberg 2009). George W. Bush reneged on his campaign promise to regulate carbon dioxide emissions and refused to enact the Kyoto Protocol, a pact by the United Nations to reduce emissions. The Bush administration was also accused of obscuring information that discussed the existence of climate change. The election of Barack Obama in 2008 signaled yet another flip in

the environmental agenda of the presidency (Samuelsohn 2014). Although Obama's first term is characterized by economic recession and reform, his second term gave much more recognition to the environment and the issue of climate change. His involvement in the Paris talks, as well as continued support for renewable energy and for reducing fossil fuel emissions, make him a proponent of the environment.

The election of November 2016 and its aftermath serve as a prime example of the politically divisive nature of climate change. Donald Trump, the Republican president-elect, has claimed that climate change is a hoax. Part of his plan for the first 100 days exemplifies his anti-climate change stance. One of the tenets of his plan includes removing restrictions on the coal, oil, and gas industries for the sake of creating more jobs (Kelly & Sprunt, 2016). He also seeks to push forward the development of the Keystone Pipeline, which is something that Obama put the brakes on during his term. In March 2017, Trump signed an executive order clearing the path for construction of the pipeline to begin. (Baker & Davenport 2017).

Trump also hopes to remove all participation in and payments to United Nations programs regarding climate change (Doyle 2017). There is also the threat of him pulling the United States out of the Paris Climate Agreement, which was formed in December 2015 and came into effect in November 2016. The agreement was the result of the United Nations Climate Change Conference and seeks to cap worldwide climate change at an increase of two degrees Celsius. However, Trump's evident attitude indicates that he will not be a supporter of these talks. In addition to this, Trump has appointed Myron Ebell, an infamous climate change denialist, as the lead man to dismantle President Obama's work on the Paris talks, the Clean Power Plan, and other regulations that are aimed at mitigating climate change.

Trump's belief regarding climate change follows the pattern of many Republicans. Not only does Trump deny that climate change is real, but he believes that jobs should be created and preserved within the oil and coal industry. This is part of the general platform of the Republican party as well. It is interesting to note that Trump, like other leading Republican politicians, was a large recipient of money from the oil and gas sector, reaching over $503,000 in donations from the industry in 2016. The Democratic party, in comparison, emphasizes sustainability and clean energy at the expense of the fossil fuel industry. Growth in the oil and gas industry, as they see it, would be wrong because it would be increasingly contributing to the issue of climate change. Although the Democratic and Republican parties both have the end goal of increasing employment and expanding the economy, they have very different opinions on how this can be achieved.

Industry and Politics

Another power that the coal, oil and gas industries possess is that they make astounding financial profits, which they use to influence people and politics. Companies such as Exxon-Mobil and BP have openly recognized the issue of climate change, but continue to fund researchers, organizations, and politicians that deny climate change. For example, between 2008 and 2010, Exxon contributed over $75,000 to Willie Soon, a researcher at Harvard University who denies any significant effect of climate change on human beings (Frumhoff & Oreskes, 2015). According to Mann, Soon has "gone through all the stages of climate change denial, arguing everything from 'global warming is natural' to 'it's good for the polar bears,'" (Mann 2016). The Southern Company, a large utilities corporation, also channeled funds to Soon, giving him up to $400,000 between 2006 and 2015.

There are also many organizations and think tanks funded by fossil fuel interests. They possess ambiguous and somewhat patriotic names such as the Alexis de Tocqueville Institution,

Cato Institute, Freedomworks, Heartland Institute, Hudson Institute, and many others (Mann 2016). The Alexis de Tocqueville Institution is a conservative, industry-funded organization that promotes lower taxes and deregulation. It has advocated against environmental policies, teachers' unions, and immigration, and has fought for the tobacco industry. Although it keeps its donors private, it has been linked financially to numerous other conservative foundations. The Cato Institute similarly advocated conservative points of view. It was founded by Charles Koch himself, and is still funded by Koch Industries. The past two CEOS of Cato have also been large executives in the banking industry. Freedomworks formed from the merger of Citizens for a Sound Economy (CSE) and Empower America in 2004. CSE was also founded by Charles and David Koch with their friend Michael Fink. Although it describes itself as a grassroots organization, its leaders represent big business. Freedomworks keeps most of its funding private, although many conservative foundations have been linked to them as donors.

The Heartland Institute describes itself as a nonprofit think tank. It received funding from the Claude R. Lambe Foundation and the Koch brothers, as well as other right-wing foundations. In 2013, it partnered with the American Legislative Exchange Council (ALEC) to advocate the rollback of renewable energy legislation. Heartland also passionately advocates climate change denialism and the unimportance of the issue (Idos et al, 2017).

Although BP has recently rescinded its support of ALEC, a lobbying group that propagates climate denialism, other companies such as Chevron, Exxon, and Shell still do (Sourcewatch 2017). However, all three of these companies have announced their recognition of climate change and the importance of taking action to mitigate it. For example, Shell's website states, "Our lives depend on energy wherever we live. But in order to prosper while tackling climate change, society needs to provide much more energy for a growing global population while finding ways to emit

much less CO_2," (Shell 2016). Similarly, Exxon-Mobil states, "We are committed to positive action on climate change and dedicated to reducing the risk of climate change in the most efficient way for society," (Exxon 2016). Chevron follows suit on their website as well: "Chevron shares the concerns of governments and the public about climate change risks and recognizes that the use of fossil fuels to meet the world's energy needs contributes to the rising concentration of greenhouse gases (GHGs) in Earth's atmosphere," (Chevron 2016). However, Chevron was the second largest donor to politicians from the oil and gas industry in the 2016 election cycle, after Koch Industries (OpenSecrets, 2016). Over 90% of the funds Chevron donated went to Republicans, and 100% of the funds from Koch Industries, a massive fossil-fuel based corporation, went to Republicans as well. Koch has also invested millions of dollars in almost 100 different climate denialist groups since the 1990s. It is clear that relationship between the coal, oil and gas industries and organizations that deny climate change is a significant one (McKenzie 2013)

So what is the impact of oil and gas on politicians? According to OpenSecrets, more than two thirds of the oil and gas sector's contributions to political campaigns has been for Republicans (2016). In 2015, Koch Industries was the top contributor to Republican politicians, donating over nine million dollars. Koch Industries is a multifaceted corporation run by the Koch brothers, Charles and David (Mann 2016). It is the second largest industry and the largest fossil fuel interest in the country. It is currently estimated that Koch has donated over $100 billion dollars to conservative political activities. Examples of entities that Koch has donated money to are Americans for Prosperity, the Competitive Enterprise Institute, the Heartland Institute, and the American Legislative Exchange. Americans for Prosperity and the Heartland Institute are primarily involved in political campaigns by denying the importance and existence of global warming. CEI has a history of backing anti-environmental legislation, with examples being

pesticide use, anti-climate change propaganda, and its support of climate change's sister debate, the tobacco lobby. Lastly, ALEC helps formulate anti-environmental legislation, and is so extreme that it has received denouncements from Google, BP, and Shell for its blatant miscommunication of facts.

Koch Industries has also entered the climate change debate from other fronts (Mann 2016). By donating money to scientific entities such as PBS and the National Museum of Natural History, they have managed to influence exhibits and presentations to sound less alarmist about climate change. Koch also attempted to buy out the Tribune Company, which runs eight daily newspapers across the nation such as the Chicago Tribune and the LA Times. However, this purchase failed when over half the staff at the LA Times threaten to quit if it went through.

James Inhofe, mentioned earlier, received most of his campaign contributions from the oil and gas industry (OpenSecrets 2016). Five of the top ten donors to Inhofe in the last five years are companies that deal in either energy or transportation. However, the #1 recipient of oil and gas money in 2016 was Ted Cruz, who received over one million dollars from the industry in the last campaign cycle. In fact, nineteen out of the top twenty recipients of money from the oil sector in 2016 were Republicans. It is interesting to note, however, that Hillary Clinton, the sole Democrat on this list, was the second largest recipient of fossil fuel funds that same year. In addition, from 2010 to 2012, donations to politicians from the oil industry increased from $34 million to $79 million, 84% of which went to Republicans. Thus, not all, but the majority, of donations go to Republicans rather than Democrats.

This partisan conflict makes the United States a relatively unique nation with regard to climate change (Batstrand 2015). Sondre Batstrand, a politician and spokesman for the Norwegian Green Party, found in his research that not all conservative parties deny climate change. In his

research, Batstrand analyzed the typical relationship between conservatives and the economy. "All political parties have to react to the issue of climate change," Batstrand claims, "and their reactions are likely to reflect their ideological background. In the literature, conservative ideology is often portrayed as a hindrance against adopting environmental measures, while another expectation is that the parties link climate change to their existing core issues, and hence conservative parties, if adopting climate measures, would favor market-based solutions in line with free market environmentalism," (Batstrand 2015). As previously discussed, the Republican party, as the dominant conservative party of the United States, boasts a platform that is heavily pro-business and low-regulation. This is especially relevant when it comes to the oil, coal, and gas industry in the United States, since these sectors provide millions of jobs and dollars to the country's economy. "In addition," Batstrand states, "the pro-business position of conservative parties makes it relevant to see their climate policies in light of the country's reserves of fossil resources, assuming that vast reserves would make the conservatives more skeptical towards climate measures," (Batstrand 2015). Because the United States is currently the number one producer of oil and gas, conservatives have a substantial reason to want to protect this sector of the economy.

The attitude of American Republicans toward de-regulating the environment is not shared by many other conservative parties around the globe. For example, the Conservative Party in Canada has vocalized its desire for action against climate change, and has even gone so far as to criticize the Canadian Liberal Party for not making enough of an effort. Although some members of this conservative party still consider this pro-environment movement to be unfounded and alarmist, the Canadian government under Conservative Prime Minister Stephen Harper has agreed to carbon pricing and to a 30% reduction in emissions by 2030, as a result of the Paris climate talks (Grandia 2015). Other foreign parties that take a proactive approach toward climate change

mitigation are the Conservative Party in the UK, the Hoyre in Norway, and the Christian Democratic Union in Germany. Overall, these three parties demonstrate an interest in spreading awareness and in helping to curb the negative effects of climate change. This is not to say that these conservative parties are as pro-regulation as their liberal counterparts. However, there is a clear discrepancy between the attitudes taken by them versus the attitude of the American Republican Party.

Psychological Factors

"It is difficult to know whether climate change contrarians have taken their positions out of good faith, ignorance, willful ignorance, or calculated deceit," (Mann 2016). The first part of this analysis sought to demonstrate the side of willful ignorance and calculated deceit perpetrated by political and commercial interests. However, to say that all those who deny the importance or existence of climate change do so with malicious intent is to make a broad (and unflattering) generalization about the American public. In order to understand why different people feel differently about the issue, it is important to look at the psychological factors at play.

In her 2015 Huffington Post article, Carolyn Gregoire discusses the concept of a confirmation bias. Confirmation bias occurs when people believe what they choose to believe (consciously or subconsciously) what is most compatible with their ideals. "They seek out information that confirms their beliefs — and ignore anything that challenges them," Gregoire says (2015). People flee from cognitive dissonance, which occurs when one's thoughts or beliefs conflict. She then applies this to climate change. "For instance," she says, "if a business leader has a vested financial interest in fossil fuels, there's a good chance he won't want to acknowledge the threat of climate change, because doing so would force him to address some uncomfortable questions about how he might be contributing to environmental destruction," (2015).

People have a natural tendency to view things in a way that aligns with their pre-existing ideas. As a result of this phenomenon, people tend to trust in leaders whose general ideas agree with their own. According to Dr. Riley Dunlap, an environmental sociologist, people take cues from leaders in situations where they do not feel strongly about an issue. For example, in the United States, the Republican party claims well-known politicians and economists, many of whom deny that climate change is real. Dr. Renee Lertzman, a psychologist and researcher, describes denial as a social activity. In order for people to successfully engage in denial, they need to be near others who similarly are in denial.

In his book *Invisible Nature,* Dr. Kenneth Worthy explores the growing disconnect between people and nature and how this relates to a lessened degree of concern for it. Research by Aaron McCright and Riley Dunlap indicates that conservative white males are the most apt to engage in risky behavior (2011). In general men are more likely than women to ignore risk, but a certain class of men who exemplify this characteristic is conservative white males (Kahan et al 2007). However, this disregard for risk may not indicate fearlessness, but instead, a fear of change (McCright and Dunlap 2011) (Kahan et al 2007). New ideas and hierarchies that may pose a threat to the status of white conservative males are met with skepticism and criticism. In addition, people tend to engage in identity-protective cognition, whereby individuals engage in behavior and associate with others who confirm their current cultural identities. "Assertions of environmental risk should pose an identity challenge to relatively individualistic persons, who equate success in the market with personal virtue," (Kahan et al 2007). This is not, however, attempting to make a large generalization about all white males, because only thirty percent of white males are politically conservative (McCright & Dunlap 2011). When identity-protective cognition is combined with conservatism, the conservative white male effect is born. The white male effect is

crucially tied to a higher affinity for accepting risk because of an inherent skepticism and dislike for people and policies that would upset current social, political, and economic conditions. These risk-accepting white males also lean toward hierarchical social structures with a clear authority figure. Because of these attitudes, white males that share these views are less likely to support trains of thought that would upset the current state of affairs, whereby they are relatively powerful.

According to research by McCright and Dunlap (2011), "while 29.6% of conservative white males believe that the effects of global warming will never happen, only 7.4% of all other adults believe so. Also, 58.5% of conservative white males but only 31.5% of all other adults deny that recent temperature increases are primarily caused by human activities." Interestingly enough, 30.4% of white conservative males also claim to have a strong understanding of the concept of global warming, whereas 18.0% of other adults would say the same. Although this seems to create a sort of paradox, it aligns with the theories of identity protection cognition and the conservative white male effect.

In addition, people tend to adopt the ideas held by their social groups (Worthy 2015). Identity-protective cognition and the white-male effect, when combined, comprise a powerful force that can be seen especially regarding environmental issues. "For instance," Worthy says, "when activities deemed integral to their cultural identities are revealed to be harmful to society, white men wielding hierarchical and individualistic views tend to react with strong skepticism," (2014). These ideas are also reinforced by conservative political and social leaders such as Rush Limbaugh, Senator James Inhofe, Roger Ailes, Ted Cruz, and many others.

The results of this phenomenon is a "collective irrationality," (Worthy 2015). Collective irrationality occurs when individuals all making individually rational decisions collectively cause an irrational outcome (Economind 2013). For example, the individual decision to drive to school

in the morning is a generally good decision, but when everyone decides to drive to school in the morning, it causes traffic congestion and may lead to car accidents. The lesson that Economind provides for this problem is that there needs to be a supervisor watching over everyone and ensuring that rationality prevails in society. Government is the best source of this control, and policies and regulations are the means by which it can correct this problem that the free market creates. However, the amount of governmental regulation necessary to fix the problem is debatable. What is known is that individually rational actions are not bad until they create a collectively irrational outcome, which resultingly harms (rather than helps) people. According to Worthy, this phenomenon occurs often with environmental issues. People make decisions on a daily basis that may benefit them, such as taking a shower, driving to work, etc., but when everyone performs these tasks excessively, it can be harmful to the environment.

Social Dominance Orientation (SDO) is another theory in the field of psychology that may explain climate change denial. SDO involves a preference for maintaining social hierarchy and the status quo (Pratto et al 1994). SDO is more common among men and is associated with higher levels of desire for social and political hierarchy. People exhibiting SDO are associated with hierarchy-enhancing careers as well. In addition, people exhibiting SDO are also correlated to having low levels of empathy, tolerance, and altruism. Felicia Pratto and several other conducted research on SDO at Stanford University (1994). According to them, "The theory postulates that societies minimize group conflict by creating consensus on ideologies that promote the superiority of one group over others. Ideologies that promote or maintain group inequality are the tools that legitimize discrimination," (1994). This study also found strong correlation between those displaying SDO and opposition to environmental activism.

Studies have also shown that SDO is correlated with attitudes of group dominance when it comes to environmental issues (Jylha & Akrami 2015). These people tend to view the environment as something inferior that should be conquered, which gives way to environmental overutilization and degradation. There is also evidence that those who promote maintenance of the status quo avoid environmental activism because it either means changing their way of life or admitting that humans have caused harm in the first place.

Social dominance theory is also directly correlated to Republicans in the United States. Two complexes associated with conservatives are right-wing authoritarianism (RWA) and SDO. RWA promotes submission to authority, conventionalism, and aggression. SDO, as mentioned prior, deals with maintenance of hierarchy through different social groups. RWA and political orientation both appear to be less successful in determining environmental attitudes than SDO (Worthy 2014 II) (Hakkinen & Akrami 2014). Speculation on why this may be refers to individual versus group authority, with the latter being more important in advocating the idea that men, as a group, must dominate nature (Stanley et al 2017).

A recent study performed simultaneously in Brazil and Sweden demonstrates this relationship. Multiple studies have revealed that conservative men are less convinced of the reality and extent of climate change (Jylha et al 2016). The study found that SDO fully mediated the effects of gender on environmental attitudes in Sweden, and partially mediated it in Brazil. It also established a relationship between conservative males and SDO in Sweden. In Brazil, a significant correlation was not found, potentially due to recent political and economic instability in the country. Their findings help to confirm that idea of the conservative white male effect, where conservatism, gender, and environmental attitudes converge. In addition, a study in Great Britain found that although climate skepticism was relatively low, it was more prevalent among older,

lower socio-economic, conservative individuals than among younger, higher socioeconomic, less conservative individuals (Wouter 2011). However, it also found that those more concerned about the environment felt more firmly about their views than those who were skeptical.

Potential Solutions

Two clear issues arise from the concept of climate change. The first is the dangerous consequences of allowing climate change to continue. The second is the uncertainty that Americans feel about it. Before the second problem can be addressed, people must be convinced of its existence and importance. However, it is not easy to convince people of this issue by simply telling them that a problem exists (Kahan et al 2007) (Gregoire 2016). If it were this simple, there would not even be a problem, because everyone, after being told the truth repeatedly by scientists, would understand and agree that climate change is real and that is is man-made. However, people require more than just a statement of fact to be convinced of its truth. This is because of the power of the human psyche. According to Dr. Susan Clayton, a conservation psychologist at the College of Wooster, "Information is not enough, largely because people are capable of huge levels of denial," (Gregoire 2016). In another study, Kahan et al found that "identity-protective cognition will induce individuals to credit or dismiss scientific information depending on its congeniality to their cultural norms." This means that even if people are told the truth, they are not necessarily inclined to believe it.

In September 2015, President Obama gave an address that called for the increased use of behavioral sciences in combatting various issues, one of which was climate change (Gregoire 2016). By understanding some of the psychological theories underlying denialism and environmental disregard, it is possible to make forward steps in changing these attitudes. This begins with understanding how people think. Before someone can be convinced of something new

that potentially conflicts with their ideologies, ideas must be communicated to them in a way that does not create such a conflict. "What it does imply," Kahan says, "is that information must be transmitted in a form that makes individuals' acceptance of it compatible with their core cultural commitments." For example, one factor of the conservative white male effect is the small/nonexistent risk that this group perceives when it comes to environmental issues. If environmental issues are shown to have a risk that is relevant to them, they may be more apt to listen and understand their seriousness. As a result, "By identifying the cultural worldviews of those most disposed to process risk information in an identity-protective fashion, our study would furnish the risk communicator with information relevant to crafting an appeal that affirms rather than denigrates recipients' values," (Kahan 2007).

One method mentioned by Kenneth Worthy to appeal to the conservative mindset is to associate problems with potential solutions. For example, he says that conservatives are more interested in hearing about climate change when it is paired with information about engineering solutions. However, Worthy is also critical of this method because he believes that a problem is no less valid if no solutions exist than if solutions do exist. What he thinks would work better is if fossil fuel dependency is exposed for what it truly instigates: a system that causes more harm than good. If people understood that fossil fuels in the long run will only increase economic and social costs of living, they would adjust their lifestyles. The argument that environmental abuse only hurts humans in the end is a valid argument, but it is not sufficient to convince skeptics of the immediacy and relevancy of climate change to their lives today.

Carolyn Gregoire agrees that combatting climate change starts with addressing the psychological reasons that people deny its existence. In a 2016 Huffington Post article, she explores the emerging field of environmental psychology. Environmental psychology analyzes on

human interactions with nature, emotional disconnect to nature, and the use of psychology to influence policy and decision-making. Dr. Renee Lertzmann, author of *Environmental Melancholia: Psychoanalytic Dimensions of Engagement,* is currently studying climate change through the lens of a psychologist. She believes that the problem lies not with a lack of caring, but with a feeling of helplessness in the face of climate change. There are feelings of loss and anxiety associated with the diminishment of the natural world. She believes the primary issue is not a lack of concern by the public, but a feeling of general powerlessness to do anything about a world that is changing. Unable to process their feelings, they are left in a state of "environmental melancholia."

In her own article in Pacific Standard, Lertzman explains how climate change denial needs to be addressed from a psychotherapeutic approach (2015). Skipping over the part where people are confused or hostile and going straight to solutions does not benefit the climate change cause. There are two sort of branches within psychology. The first is research into the cognitive, behavioral, and risk-assessment areas of psychology. The second focuses on psychotherapy, which encompasses human interactions to discuss and overcome stressful situations. The second branch, Lertzman says, is the vehicle through which climate change denialism needs to be addressed. By honing on on the feelings of loss people feel in regard to environmental degradation, climate change activists can practice "compassionate acknowledgement", a technique used by psychologists that makes patients feel as if their feelings are heard and understood. Using a sympathetic rather than argumentative approach, activists can finally begin to crack the shell of skeptics.

Dr. Clayton suggests that one way to combat this is to connect people back to nature. Her studies have shown that increased access and utilization of zoos and aquariums are connected to a

higher level of concern about climate change. Lertzman also discusses the method mentioned above by Worthy whereby information is presented in dichotomies of environmental destruction paired with hope for the future (2015). She says that studies have shown that people are more responsive to information when it is combined in this fashion, and not just as one side or the other. Telling people depressing pieces of information does not incentivize them to get up and go do something about it. Instead of just giving them the ugly truth, it is best to pair it with a strategy for overcoming it.

A study performed at the College of New Jersey also discovered a methodology for political candidates to appeal to different constituents based on their RWA/SDO status. It found that political parties appeal to their constituents more effectively when their advertisements emphasize values and themes that are inherently important to members of that party. Underlying this research is an understanding of the framing effect, which encompasses the ability of various policy stances to be set in a certain light so as to appeal to different political factions (2013). For example, same-sex marriage is viewed as an issue of morality versus equality, depending on which side of the debate is asked. In addition, different frames can be used to justify the same policy stance by people within the same party. "Specifically, candidates can differentially influence support for their candidacies by offering messages that make the values and motives of people high (or low) in right-wing authoritarianism (RWA) and social dominance orientation (SDO) salient," (Crawford et al 2013). Utilizing knowledge about the higher prevalence of RWA and SDO among conservatives (and thus skeptics) can help climate change activists to begin to understand, appeal to, and cultivate a trust with the general population.

A study at Princeton University in 2015 figured out five ways to make climate change a more real issue for Americans (Van der Linden et al, 2015). Their first conclusion is that climate

change is not a tangible issue to most people. Much of the data currently out there either relies heavily on statistics or forecasts for the future. It is difficult for people to internalize the consequences of climate change when it is only described in terms of numbers and theoreticals. In order to combat this, climate change needs to be seen as a personal experience by people, so that they will then better understand and care more about the issue. One way to accomplish this is by emphasizing extreme weather events as a direct link to climate change. Because severe weather is something almost everyone has experienced (and will continue to experience more frequently as a result of climate change), it can help in making climate change a reality.

Another method they suggest is to utilize the power of social norms. When is comes to climate change, personal efficacy, or one's individual ability to make a difference, seems trivial. Community efficacy is more powerful, but requires everyone to support one idea or movement. Many other studies have shown that people will tend to follow what their community is doing, i.e., they will align themselves with current social norms. Therefore, if a majority of the community supports environmental action, others will follow suit. The main hindrance to this method, however, is first getting most of the community to support climate change activism. A third problem is that people view climate change as an abstract, distant, and future threat. Because people discount the future consequences of climate change, there is little incentive to act on it now. There is a temporal and geographic gap that prevents people from caring enough to do something about climate change. Two ways to combat this are to emphasize the immediate and localized effects that are happening today. For example, temperature increases and sea level rise are both prevalent issues today. However, a larger focus on sea level rise may be more effective in coastal regions, whereas a focus on temperature rise may be taken more seriously inland (where temperature changes tend to be more drastic).

A fourth way suggested by the study is to replace the emphasis on losses with an emphasis on gains. Climate denialists use job loss, tax increases, and overbearing government regulation as three infringements that will occur on the rights of the American people if action is taken against climate change. Instead of associating activism with loss, it should be associated with gains. Some gains that could be used are preventative and involve maintaining stable water resources, agriculture, and national security. The fifth and final suggestion the study makes is to appeal to people's' intrinsic, rather than extrinsic, desires. Extrinsic desires focus on external wants (such as money) to spurn a certain action. Intrinsic desires, on the other hand, appeal to the morality and larger needs of the individual. While extrinsic motivational factors can be effective in the short term, intrinsic motivation is more likely to drive long-term change. As a result, environmental policies should focus less on monetary rewards and more on character, morality, and community.

Another study lead by van der Linden through a partnership of Yale and George Mason Universities found another way to "inoculate" against climate change denial (DeWeerdt 2017). When participants in the survey were told that "some politically motivated groups use misleading tactics to try to convince the public that there is a lot of disagreement among scientists," their perceptions of scientific agreement on climate change increased 6.5%. When respondents were told that 31,000 scientists signed a petition stating that carbon dioxide did not cause any problems, their overall perception of scientific agreement decreased 9%. Interestingly enough, when such respondents were then told that names on the petition included false signatures such as Charles Darwin or the Spice Girls, their confidence in scientific consensus increased 13%. This disclaimer, put at the end of denialist arguments, can inoculate against the effects of the denialist message.

This idea that there is no scientific consensus on climate change damages public opinion of the problem, thereby stunting any progress by climate change activists. Put succinctly,

"Polarization can be amplified when the inherent uncertainty of science itself is used to cast doubt on the existence of a scientific consensus," (van der Linden 2017). In order to take action on climate change, more faith needs to be put in scientists. Although not perfect creatures, most scientists are considerably less biased than the politicians and businesspeople who criticize them.

Conclusion

"Information—about our planet or about anything else—means nothing until it is interpreted."

Michael Mann, Our Crying Planet

This paper has given a brief overview of some of the most important factors in the political debate over climate change. By delineating the scientific, economic, historical, and international context of the American debate, this essay has shown that there is no simple or easy answer to why climate change is such as important political issue. The Republican party, for the most part, refuses to address the issue of climate change, whereas the Democratic party has acted and continues to act to protect the environment and mitigate global warming. The Democratic Party has recognized the threat that climate change poses and has chosen to be proactive about its approach, as can be seen from the Obama administration's involvement in the Keystone pipeline, the Paris talks, the Clean Power Plan, and support of renewable energy. Not every member of every party shares these attitudes, but they are an overwhelming trend that greatly differentiates between them. However, if political parties would focus less on competing against one another and more on working together, they may be able to accomplish more than they have in the past several years. Partisan gridlock has prevented Congress from achieving any real change on any front. In addition, the Democratic Party's recent losses in federal elections indicate that their methods are not working. It is also not too late for the Republican party to change their stance with regard to climate change. After all, it is understandable that one of the largest and most influential organizations in the United

States would exercise caution in the face of a movement that has potential to instigate social, economic, and political unrest. The Republican party has made an effort to not be reactionary to various movements, which is something that has contributed to its resiliency and durability over many years.

If common interests can be honed in on, possible solutions and agreements may be achieved that will satisfy everyone and prevent climate change from worsening. Looking towards other nations that have achieved more progressive climate change regulations may also help to resolve this political contention. The U.S. has a reputation for being prideful and, frankly, somewhat laughable to other developed nations, especially in areas where the American government is less liberal than other nations. For example, the U.S. has fought hard against universal health care, higher taxes, and other regulations that would seemingly infringe on American rights but are commonly accepted elsewhere. However, if the U.S. would look outside of itself and toward other nations, it will see models of successful countries that are benefitting immensely from taking action against climate change.

In addition to the political debate is a deeper psychological issue. Not all deniers of climate change are funded by fossil fuel money and have an ulterior motive. Instead, some people are predisposed to think in certain ways. Advocating the status quo is not a bad thing if one leads a relatively successful or happy life. However, not everyone feels this way, and those who do fail to realize that their way of life will in fact change drastically if no action is taken against climate change. Distrust of scientists is another obstacle to climate change action. When scientist disagree, it is difficult for the average person to decide what to believe. This is why scientists who support denialism create a larger issue in the heart of Americans - if scientists, who are supposed to be impartial and intelligent people, cannot be trusted, who can?

In conclusion, climate change is a serious problem that is not being adequately addressed by a large portion of the American population. The partisan divide between the Republican party and the Democratic party has thrown a wrench into this nation's ability to take effective action to mitigate climate change. In addition, big businesses have a vested interest in ensuring future profits, leading them to fund (and oftentimes sway) many political leaders. In addition to the political factors are the psychological ones that can lead to denial for a variety of reasons, the largest being the conservative white male effect, social dominance orientation, and a growing feeling of disconnect between humans and nature.

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